

MONTANA TEEN DRIVER EDUCATION AND TRAINING

Module 4.4 – Rural and Highway Driving Lesson Plan & Teacher Commentary

Long-term Learning Goals:

Students review the Highway Transportation System (HTS) and how cooperation by federal, state, local, and individual systems and agencies function together to provide a safe and lawful driving environment. Students understand the impact and consequences of personal driving behaviors on other users.


Students distinguish how laws, driving conditions, and characteristics in rural areas are different than other driving environments and apply time and space management strategies with vision control, motion control, and steering control for good driving habits within rural driving environments.

Students' Learning Targets:

1. I can list the components of the Highway Transportation System and describe how numerous agencies and individuals contribute to the function and management of the Highway Transportation System.
2. I can assess the impact and consequences of personal driving behaviors on other users in the Highway Transportation System.
3. I can list, describe, and respond to characteristics of rural driving environments.
4. I can recognize and respond to signs, signals and markings.
5. I can recognize, evaluate, and respond to hazards associated with rural driving.
6. I will be aware of and respond to animals in rural areas and know and abide by Montana's Open Range Law.
7. I can describe, evaluate, and respond to road conditions with proper lane position and speed.
8. I can describe and demonstrate good habits for passing and being passed on two-lane and multi-lane rural roads.
9. I can recognize and respond to slow-moving vehicles.
10. I can develop and demonstrate time and space management strategies for rural driving environments.

Materials Needed:

1. Module 4.4 PowerPoint Presentation
2. Module 4.4 Fact Sheets (printed for each student)
3. Module 4.4 Teacher Commentary (printed out)
4. Paper

<p>TEACHER COMMENTARY</p> <p>The following teacher commentary includes questions you can ask during the presentation to engage students and have them develop key concepts related to rural and highway driving.</p>	<p>Thumbnails of the module slides are provided to help you to connect the materials, data, and questions with the presentation.</p>
<p>Slides 2 and 3: Module 4.4 Objectives</p> <p>These slides provide a summary of the Essential Knowledge and Skills topics for this module.</p>	
<p>Slide 4: Highway Transportation System</p> <p>The Highway Transportation System (HTS) has three components that every driver needs to be aware of:</p> <ol style="list-style-type: none"> 1. Have the students list the different types of <u>roads</u> in Montana. Share the list with the class. 2. Have the students list the different types of <u>vehicles</u> in the HTS. Help them out with any they may have forgotten. 3. Have the students list the different types of HTS <u>users</u> and their different skill levels. <p>The lists are pretty extensive and you may need to help the students complete the list. It is important that they understand the complexity of the HTS and that each element needs to be managed in the context it is encountered. For instance, passing a bicyclist on a 70 mph road with no shoulders is much more dangerous than passing a bicyclist on a wide road with big shoulders.</p>	<ol style="list-style-type: none"> 1. Roads: from dirt and gravel roads to Interstates 2. Vehicles: bicycles to large oil rigs 3. Users: Pedestrians, cyclists <p>Public roads are maintained by various agencies: counties, cities, and state agencies are all responsible for building and maintaining roads. Some private roads are maintained by land owners or contracted out to companies or county or state agencies.</p> <p>Vehicles are the responsibility of the owner operator and many are in various states of maintenance or repair.</p>
<p>Slide 5 – Road Departure Fatal Crashes in Rural Montana (2001-2012)</p> <p>The red dots on this map represent fatalities attributed to road departure crashes in rural areas in Montana. In the years 2003 to 2013, there were 8,422 single vehicle road departure crash fatalities and incapacitating injuries.</p> <p>Ask the students:</p> <ul style="list-style-type: none"> • Can you find your town on this map and the roads you are likely to drive on when you get your license? • What is a road departure crash? Why do you think there are so many road departure crashes on rural roads? 	 <p>Source: <i>Road Departure Crashes and High Crash Corridors/High Crash Locations</i> (MDT, October 2013)</p>



Slide 6: Signs, Signals, and Roadway Markings

Have the students work with a partner and identify what types and amount of information they can gather from the signs, signals and roadway markings in this image.

Three types of signs:

1. Guide—route signs, signs that tell you where to go to Great Falls or Lewistown.
 2. Warning—Stop ahead.
 3. Regulatory—Stop sign.
- Signal—Flashing red light, stop at intersection.
 - Markings—Double yellow line in the middle separates traffic going in opposite directions and no lane changes allowed, solid white line on right marking the right edge of the lane, yellow curb indicating a no-parking area, and a white stop bar at the intersection indicating where the driver needs to stop.
 - Rumble strips advance warning—the pavement is grooved and will rumble as the driver goes over them to warn them of a stop ahead.



Slide 7 – Hazards of Rural Driving

Not all roads are the same. Some lanes on the interstate are 12 feet wide and some rural roads are barely nine feet wide, if that. With narrow roads comes narrow shoulders and the risk of run-off-the-road crashes.

Each of the situations listed above contribute to an increased risk of serious and fatal crashes. Understanding these can help drivers make choices to manage them when they encounter them.

Highway hypnosis a mental state in which a person can drive a truck or automobile great distances, responding to external events in the expected manner with no recollection of having consciously done so. In this state, the driver's conscious mind is apparently fully focused elsewhere, with seemingly direct processing of the masses of information needed to drive safely.

Velocitation is caused by long periods of high speed travel. The eyes become fatigued in the horizontal plane to images streaming through the windshield. When the driver leaves the freeway or comes into a lower speed zone the driver will think he is going slower than he is. To prevent this, the driver needs to know the possibility exists and they need to go slower than they feel they should. They need to make frequent speedometer checks



Because there are long distances between towns and many isolated roads, a driver involved in a crash or vehicle emergency will have to wait for help to arrive. Compound that with limited cell phone coverage and the potential for life threatening situations increases dramatically.

until their eyes and mind become accustomed to the new lower speeds.

Fatigue Lack of sleep and a long drive with little change in scenery and roadway contributes to drowsy driving dangers.

Slide 8 – Rumble Strips

More than half (53 percent) of U.S. fatal crashes occur after a driver crosses the edge or centerline of a roadway. Two-thirds (67 percent) of these fatal crashes occur in rural areas.

What causes drivers to drive off the roadway or out of their lane?

Driver fatigue and drowsiness; distracted driving; and slippery road surfaces and poor visibility in adverse weather conditions. These factors are sometimes compounded by driving too fast. Alcohol and drugs can contribute to both fatigue and speed. Driver fatigue also is induced by highway hypnosis, which occurs when long, monotonous stretches of highway reduce the driver's concentration.

How do rumble strips prevent crashes?

Drivers who unintentionally drive off the pavement edge or cross the centerline feel and hear rumble strips when they create noise and vibration inside the vehicle through interaction with the vehicle tires. Often this alert is strong enough to get the attention of a distracted or drowsy driver, who can quickly make a corrective steering action to return to the roadway safely. Rumble strips also alert drivers to the lane limits when conditions such as rain, fog, snow or dust reduce driver visibility.

Slide 9 – Open Range

Open-range law in Montana allows ranchers to let their livestock—cows, sheep, and horses—use the range with no roadway fencing on local roads.

Livestock are often trailed on highways and roads and can also wander onto roads any time of day or night.

Grazing livestock on a state highway is unlawful.
(MCA 60-7-201)



Slide 10 – Beware of Invisible Cows

This slide starts out with a dark picture showing the headlights of the SUV and just the bottom half of some Angus cows. On a dark night the cows are invisible. If the driver is doing the speed limit of 70 mph they will be on top of them before they can brake and steer.

Strategies for seeing invisible cows (or any dark obstruction in the road):

1. Slow down.
2. Use high beams when possible.
3. Scan to the far edge of where your headlight illuminate.

Livestock may not be herded or driven on an interstate or state primary highway during nighttime (MCA 60-7-204)

**Slide 11 – Wind and Large Vehicles**

Because of their large profile, trucks and RVs are susceptible to being blown over. Passenger vehicles can also experience difficulties with wind and can be blown off target, into the path of other vehicles, or onto a shoulder or into a ditch.

- What should you do when passing a large vehicle on a windy day?
- What should you do if you are driving a large vehicle like a lifted pickup truck on a windy day?
- What happens when you pass an oncoming truck or large vehicle when the wind is blowing across the road? What will your car do?
- How can you manage the change in wind pressure before, during, and after you pass an oncoming large vehicle?

**Slide 12 – Describe, Evaluate and Respond to Road Conditions**

The slides that follow have varying conditions faced by drivers on rural roads:

Ask the students:

- What info can you gather from signs?
- What info can you get from “paint”?
- What info can you get from surface conditions?
- How should you drive on this road?



Slide 13 – Describe, Evaluate and Respond

Have the students describe what they see in this picture that will help them KNOW how to drive through this curve.

1. No passing zone pennant on left side of road.
2. Left curve ahead
3. Recommended speed 45 mph
4. Intersection ahead on left
5. Narrow shoulders
6. Double yellow lines in middle of road
7. Road surface is dry and bare
8. Slope of the road in the curve is neutral to positive sloped.

Remind the students that they need to make all of these decisions while driving at 70 mph. If they search in their target area they can begin making adjustments in a timely manner. If they do not, they will have only a few seconds to make the adjustments to manage this curve.

**Slide 14 – Describe, Evaluate and Respond**

Use the following images to help the students identify the special characteristics of rural roads and highways.

Questions you may want to ask:

1. What kind of surface is on the road?
2. How does that affect my traction?
3. What kinds of roadway markings are present?
4. Are they visible?
5. Is the roadway straight or does it have curves both positive and negative slope?
6. How wide are the shoulders?

**Slide 15 - Describe, Evaluate and Respond**

Do the same activity with this series of images.

Sometimes there is no paint or signage so the driver must read the clues on how to drive a road with the best speed and lane position for the conditions.

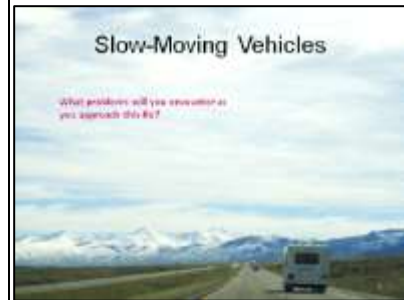
- What info can you gather from signs?
- What info can you get from “paint”?
- What info can you get from surface conditions and roadway design?



Slides 16 and 17 – Passing and Being Passed - Slow-Moving Vehicles

Slow-moving vehicles present problems for drivers. What problems will you likely encounter as you approach this RV?

- Visibility around the vehicle.
- Different speeds.
- To pass or not to pass.
- Different considerations if it's a two-lane highway or has a passing lane.
- Weather conditions and snow or ice on the road.



Slide 18 – Slow-Moving Vehicles

What problems will you likely encounter as you approach this tanker truck?

- Visibility and the truck driver's *no-zone*
- Speed difference
- Path of Travel blockages
- Wind
- Possible lane changes



Slide 19 – Remember the No-Zone

Click on slide to make photo of blown-over trucks appear.

Don't cut off trucks. Total stopping distance is very different for a large truck than a passenger car. So know that cutting it close with a truck can cut your life short.

Stay out of the truck's blind spots/No Zones. Trucks have very large blind spots. Do not stay in a truck's blind spots.

Keep a safe distance. While it is never safe to tailgate any vehicle on the highway, following too close is particularly dangerous around large trucks and buses because the size of these vehicles prevents you from seeing the road ahead and having sufficient time to react to slowing or stopped traffic or another obstacle.

Trucks make wide turns. Because of their large size, remember that a truck making a right turn may first swing left to clear the corner. Conversely, a truck making a left turn may first swing right to clear vehicles and other objects on its left side. Expect this and be prepared!

- When driving on a rural road or highway, how can you be seen around a truck?
- How can you help the truck driver see you?



The tips included here are from the Commercial Vehicle Safety Alliance website: Teens and Trucks: Share the Road
http://www.cvsa.org/programs/teens_and_trucks.php.

Slide 20 – Slow-Moving Vehicles

What problems will you encounter as you approach these trucks?

- Line-of-sight blockages
- Speed difference between you and the trucks and between the two trucks themselves
- Path of travel blockages
- Wind
- Possible lane changes by either truck
- Slowing of the trucks as they get closer to the hill

**Slide 21 – Passing and Being Passed**

Throughout the video there are a series of questions that drivers should ask themselves before passing and making lane changes, and being aware of others passing them. You can pause the video at various points and ask the students to respond or this could be done as a group or partner activity.

The short video automatically pauses at certain points and allows you to repeat a section or move forward to the next one. Review ahead of time to decide how to use this activity with your students.

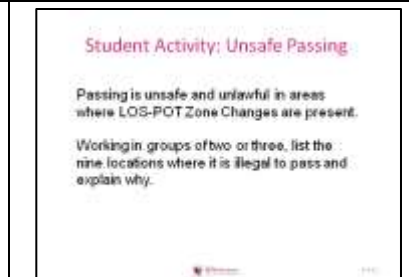
1. Passing and Being Passed: Three sections divided by pauses at 38 seconds, 46 seconds, and 61 seconds
2. Being Passed – 54 seconds



If you downloaded this presentation from the OPI's website, you will also need to download the file **Passing Activity.pdf** into the same folder. Otherwise, the video will not play. Click on it and it will begin to play. Make sure your speakers are turned up.

Slide 22 – Student Activity – Unsafe Passing

Follow the directions on the slide. Have the students discuss and then share their results. The nine illegal passing locations or situations are listed on the next slide.

**Slide 23 – Student Activity – Unsafe Passing Locations**

You can determine what points to award. The important part is that your students participate and identify where it is illegal to pass. They also need to understand that these areas were made illegal because they are unsafe and can cause serious and fatal crashes if drivers pass other vehicles in these situations.



Slide 24 – TowPlows

TowPlows will be introduced to Montana highways during the winter 2013-14 in five areas: Butte, Bozeman, Miles City, Missoula and Great Falls.

The TowPlow can be rotated to one side which doubles the plow width of a tandem-axle snowplow truck. One driver and one truck can clear double lanes efficiently. At first glance, it may look like the truck has a jackknifed trailer. The road behind the plow is the safest place to drive. Slow down and stay at least five car lengths behind the snowplow. Periodically plow operators will pull to the side or rotate the Tow Plow out of the way and allow vehicles to pass.

What else can you do to control your vehicle in snowy conditions?

- Turn on headlights
- Turn off cruise control settings and reduce speed
- Watch for icy conditions
- Keep both hands at 9 -3 on the steering wheel



Slide 25 – Lawful or Unlawful?

In Montana, it is legal to exceed the speed limit by 10 mph to pass a vehicle when it is safe and prudent to do so.

61-8-303. Speed restrictions. (1) Except as provided in 61-8-309, 61-8-310, and 61-8-312, the speed limit for vehicles traveling: (2) A vehicle subject to the speed limits imposed in subsection (1) traveling on a two-lane road may exceed the speed limits imposed in subsection (1) by 10 miles an hour in order to overtake and pass a vehicle and return safely to the right-hand lane.

However, if you are following a car that is going the speed limit, you don't have a reason to pass them. Slow down to create space between you and the car ahead, increase your following distance to four seconds, and enjoy the drive.



Slide 26 – Passing Lanes

Some two-lane highways have special passing lanes to allow drivers going the speed limit to pass slow-moving vehicles, especially on curvy and hilly roads where passing safely is difficult.

You might find yourself in a “platoon” of cars following a slow vehicle with unsafe space between them. Do you try to pass one or more of the cars in the platoon?

Is it safe to tailgate the car in front of you so you can make a quick pass on a two-lane highway? How much time can you actually save doing this? What are the risks?

If you see a sign that says a passing lane is coming up in a mile or two, wait for it and pass the slower vehicles safely.



Slide 27 – Slow-moving Vehicles

- Designed to travel no faster than 25 mph
- Must have a foot brake and turn signals
- Must display the “slow moving” emblem
- May travel on public roadways during daylight hours
 - Exception for emergency, snow removal equipment and farm equipment on non-interstate highways and equipped with flashing lights visible for 500 feet.



Slide 28 – Wildlife

Highway signage indicates likely areas you might encounter wildlife. You should expect to see wildlife on any road, in any location in Montana. Reduce speed in animal crossing areas and watch carefully for the presence of animals.

What to do if you see wildlife on or near the road:

- If a herd is on the road, stop and let the herd clear the road.
- Avoid high beam or flashing headlights – the animals could become confused.
- Do not swerve – it’s better to hit an animal than to crash head on into another vehicle
- Use controlled braking to slow down and stop.
- Hold on to the steering wheel.
- If a crash with an animal is inevitable, reduce impact, when possible, by making a glancing hit with controlled steering.



Deer, elk, pronghorn antelope, and moose killed by vehicles on Montana roads can be legally harvested as long as the person taking the animal holds a “Vehicle-killed Wildlife Salvage Permit” from the Department of Fish, Wildlife and Parks. Read about the new law passed by the 2013



- Do not attempt to render aid to the animal.

The first image shows a standard deer crossing warning sign on MT 83 accompanied by the length of the road section where deer or other wildlife may cross the road.

Legislature:

<http://fwp.mt.gov/hunting/licenses/salvagePermit.html>.

Slides 29 and 30 –Time and Space Management

This is a review of Zone Control.

It is important to include a brief discussion on how to:

1. Search to the target area—Find any LOS or POT blockages.
2. Search to the 15 second range—Solve blockages by checking related zones and get best speed, lane position and communication.
3. Search to the 4 second range—Control and make any last minute changes to speed, lane position, and communication.

Time and Space Management

- Use an orderly visual search pattern.
- Search to your target area (Vision Control).
- Reduce speed when there are line-of-sight or path-of-travel restrictions (Motion Control).
- Reduce speed when there is a change in traction.
- Reduce speed in wildlife areas and crossings.

Slides 31-32 – Limited Access

Limited access roads are also known as freeways or expressways. All of the issues associated with rural and highway driving exist on limited access roads. However, you will encounter higher speeds—posted speed limits vary between 50-75 mph— and there is limited access entering and exiting from freeways. Distances from on-ramp to exit could be 20-30 miles, so plan your trip and know where you need to exit. Be aware of highway hypnosis, fatigue, and velocitation. Note the 25 mph exit speed sign.

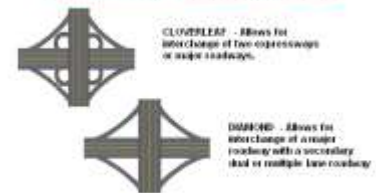


Slide 33 – Highway Interchanges

For limited access highways, this includes 2 of the 4 types commonly used to allow access on and off a highway, freeway or expressway.

Cloverleaf Interchange: Allows for interchange of two expressways or major roadways with minimal disruption of speed or movement. The cloverleaf usually has entrance and exit weave lanes, since traffic leaves one roadway and enters from another roadway. Curved roadways have banked and flat exits, which lead to braking and steering problems as drivers adjust from high speed to the speed of the exit curve. The curves are often noted by reflector poles, which are frequently knocked down by vehicles that lose traction due to excessive speed on the entry and exit of the curved roadways.

HIGHWAY INTERCHANGES



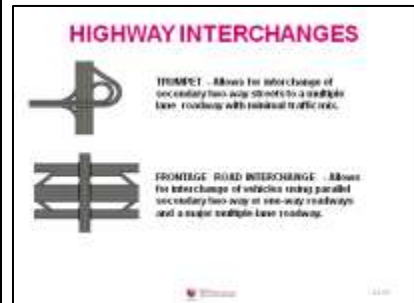
Diamond Interchange: Allows for interchange of a major roadway with a secondary dual or multiple lane road way. The diamond interchange may have traffic control devices on the intersecting secondary roadway, which allow for left and right turns onto the secondary roadway. The signals may be used to allow left turns from the secondary roadway to the entry ramps of the major multiple roadway. Lane markings may indicate lane position on the approach to the intersection. A diamond interchange will allow the driver to re-enter the entrance ramp by moving across the intersection of the secondary road way.

Slide 34 – Highway Interchanges

For limited access highways, this slide includes 2 of the 4 types commonly used to allow access on and off a highway, freeway or expressway.

Trumpet Interchange: Allows for interchange of secondary two-way streets to a multiple lane roadway with minimal traffic mix. The major function of a trumpet intersection is to replace the T-intersection at the junction of two roadways. These intersections are often found when interstate feeder roads stop at the interstate roadway or loop. For example, Interstate 64 may stop at Interstate 295, since Interstate 64 would direct drivers from a major city to the Interstate Loop (295) or the Interstate (95).

Frontage Road Interchanges: Allows for interchange of vehicles using parallel secondary two-way or one-way roadways and a major multiple lane road way. Frontage road turnarounds allow drivers to exit a multiple lane roadway and use the opposing frontage road to enter the multi-lane roadway in the opposite direction. They allow dense city traffic flows to mix efficiently with higher speed traffic flows on the multiple lane road way. Yield rules and roadway markers on the frontage road may vary, depending on the direction of traffic flow.



Slide 35 – Expressways (video)

This 4.5-minute video demonstrates some of the issues driving on limited access highways, freeways or expressways. Merging onto highways and navigating lane changes are covered as well as effectively using Zone Control strategies.

You can pause the video by hovering your cursor over the video. A play menu will pop up and you can pause the video and discuss the concepts.

**Slide 36 – Exiting the Freeway (video)**

This 6-minute video demonstrates some of the issues with exiting limited access highways, freeways or expressways. Zone Control strategies are used.

You can pause the video by hovering your cursor over the video. A play menu will pop up and you can pause the video and discuss the concepts.

**Slide 37 – Highway Exits**

How can you tell an exit from this highway is coming up? If you exit here, will you be able to reenter?

- Exit numbers will be the same number as the mile marker.
- Mile markers show the number of miles from where the Interstate route entered a state.
- Mile markers begin counting at the state line in the south and west.
- Odd numbered highways are north-south routes e.g. I-15.
- Even numbered highways are east-west routes e.g. I-90 and I-94.
- Mile marker numbers always get larger as drivers travel east or north.

**Slide 38-39 – Standards and Benchmarks**

Standards and Benchmarks 1-8: This is for your reference and not to be read to the class verbatim. Please review prior to the lesson so you are aware of what the student will be required to know at the end of the module.

